NEVADA DEPARTMENT OF AGRICULTURE
2004
WEST NILE VIRUS (WNV) REPORT

The first case of West Nile Virus (WNV) in the State of Nevada was diagnosed in a crow from Carson City on July 16th, 2004. The Nevada Animal Disease & Food Safety Laboratory (NADFSL) performed all testing of mosquito pools, dead birds and sentinel chicken flocks, and submissions from horses and other companion animals, poultry and wildlife. Samples were submitted for testing by vector control and wildlife agencies, health departments, veterinarians, and residents throughout the state.

Dead Bird Surveillance

During the year 2004, the NADFSL in Reno received 852 dead bird samples for WNV testing from every county in the state except Lincoln and Pershing counties. Many of these samples were also tested for Western Equine Encephalitis Virus (WEE) and the St. Louis Encephalitis Virus (SLE). Out of the 852 submitted samples, 150 were found to be positive for WNV (Fig.1). Of these 150 birds, 108 were corvids, 28 were raptors, and 14 birds representing other genera. None of the samples were found to be positive for WEE or SLE.

Dead birds, particularly ravens, crows, magpies and other large birds of the Corvidae are usually the first sign of the arrival of WNV. They are referred to as 'indicator species'. They play an important role in detecting the spread and/or reemergence of the virus. Dead bird submissions from urban areas were restricted after at least two infected birds from the same zip code were submitted (Fig. 4). Submissions from rural counties were not restricted and remained sparse throughout mosquito season 2004. At the beginning of September, the primary focus of surveillance and testing shifted to mosquito pools and dead birds were only accepted for testing if they represented rare or endangered species or were dropped off directly at the laboratory.

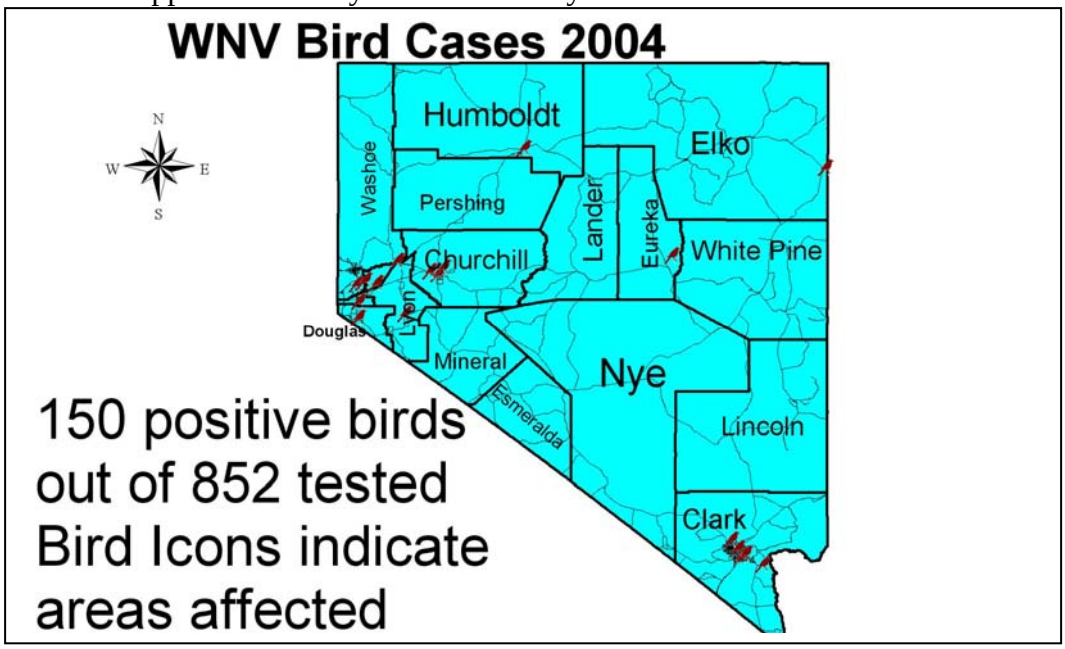


Figure 1.

Table 1. Number of positive birds broken down by county.

County	Birds Tested for : WNV	WEE	SLE	Corvids positive WNV	Raptors positive WNV	Others positive WNV	WEE positive	SLE positive
Carson	31	31	31	15	0	0	0	0
Churchill	82	82	82	18	2	1	0	0
Clark	164	164	164	1	5	1	0	0
Douglas	31	31	31	15	3	2	0	0
Elko	22	22	22	0	1	0	0	0
Esmeralda	1	1	1	0	0	0	0	0
Eureka	3	3	3	0	1	0	0	0
Humboldt	67	67	67	0	0	1	0	0
Lander	32	32	32	0	0	0	0	0
Lyon	120	120	120	13	8	1	0	0
Mineral	4	4	4	2	0	0	0	0
Nye	2	2	2	0	0	0	0	0
Storey	1	0	0	1	0	0	0	0
Washoe	272	272	272	43	7	8	0	0
White Pine	20	20	20	0	1	0	0	0
Totals	**852**	**852**	**852**	**108**	**28**	**14**	**0**	**0**

Mosquito Pool Surveillance

Mosquito surveillance was conducted in every county throughout the state of Nevada. Mosquitoes were trapped, identified as to species and subspecies, were sorted into pools of fifty or less females of the same subspecies, and then submitted to the NADFSL for testing. These pools were tested utilizing the VecTest™ and Quantitative Real Time Polymerase Chain Reaction (QRT-PCR) testing. The VecTest™ is a paper chromatography test which detects viral proteins. Reliable detection of virus in a mosquito pool is only possible if 100,000 viral particles or more are present in the sample. QRT-PCR is much more sensitive and is used as the second test on each sample to identify infection rates of as low as 1 viral particle per sample. A total of 748 mosquito pools were tested for WNV and 132 were found to be positive (Fig. 2). All of these pools were also tested for WEE and SLE and found to be negative.

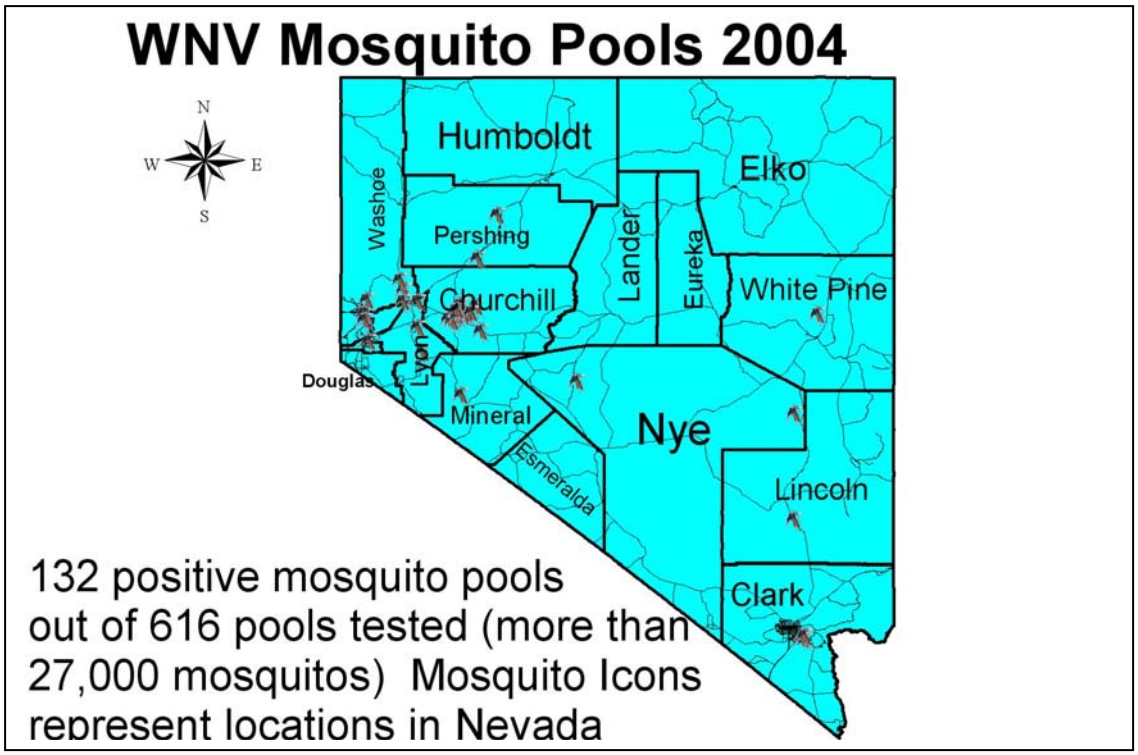


Figure 2.

County	Pools tested WNV	Pools tested WEE	Pools tested SLE	Positive WNV pools	Positive WEE pools	Positive SLE pools
Carson	15	14	14	1	0	0
Churchill	223	223	223	32	0	0
Clark	132	132	132	18	0	0
Douglas	1	1	1	0	0	0
Elko	55	55	55	0	0	0
Esmeralda	10	10	10	0	0	0
Eureka	2	2	2	0	0	0
Humboldt	2	2	2	0	0	0
Lander	2	2	2	0	0	0
Lincoln	10	10	10	0	0	0
Lyon	115	115	115	23	0	0
Mineral	16	16	16	3	0	0
Nye	18	18	18	6	0	0
Pershing	18	18	18	6	0	0
Storey	4	4	4	0	0	0
Washoe	104	104	104	37	0	0
White Pine	21	21	21	6	0	0
Totals	**748**	**748**	**748**	**132**	**0**	**0**

Table 2. Positive mosquito pools by county.

Sentinel Chicken Flock Surveillance

Chickens are commonly used as sentinel animals for WNV surveillance. In 2004, the NADFSL performed ELISA tests, from May through October, on blood samples from 15 different sentinel flocks located throughout the state. Each flock consisted of at least 10 chickens and every bird within a flock had blood drawn every 2 weeks, which was sent to the NADFSL for testing. Prior to placing the sentinel flocks, each bird was tested for WNV antibodies and found to be negative. During the test period 2004 there were 3 sentinel chickens that seroconverted, indicating exposure to the WNV during the surveillance period. All 3 of these birds were located in Churchill County.

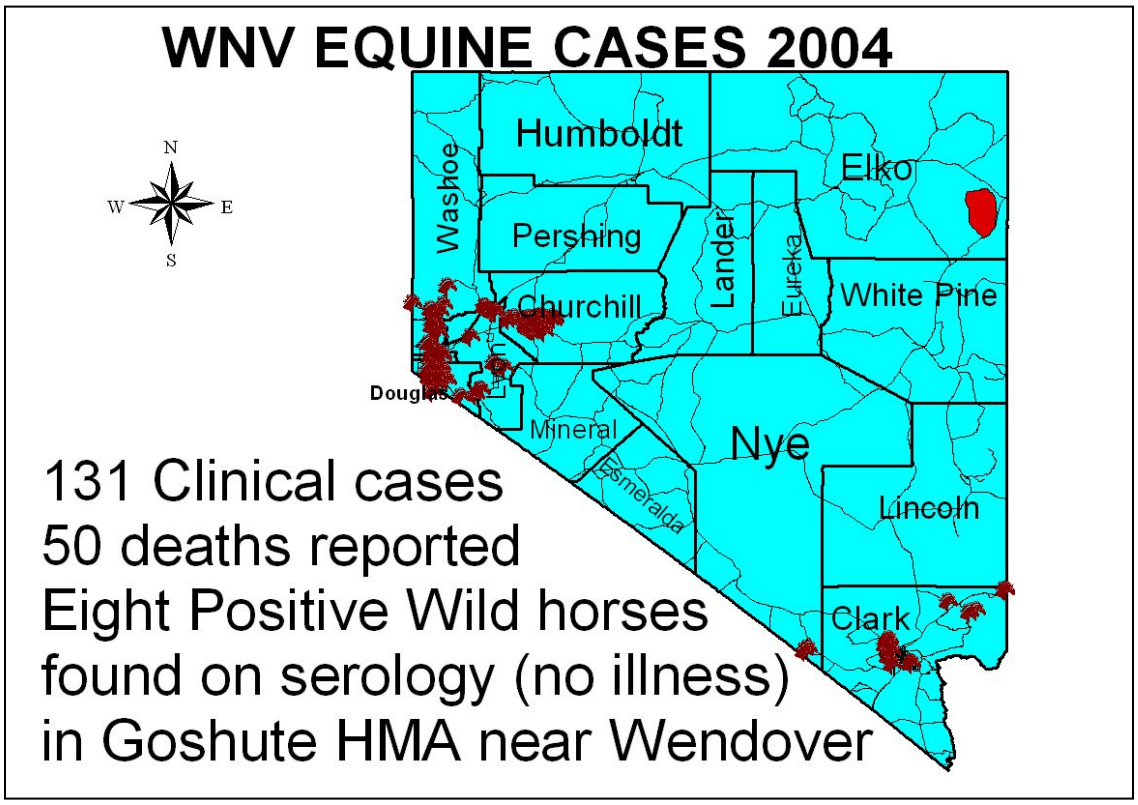
Equine Testing

During the summer and fall of 2004, the NADFSL tested 224 domestic horses, using an IgM ELISA test, for WNV. A total of 131 domestic horses were found to be positive for WNV within the State of Nevada (Fig. 3). Of the 131 positive horses, 50 died or were euthanized. Of these 50 horses, 1 was fully vaccinated for WNV, while 13 were partially vaccinated. For the purpose of this report the definition of partial vaccination includes horses that were either vaccinated once or twice in 2003 but didn't receive a booster in 2004 or received their first and only vaccination in 2004 or had received their first 2 vaccinations in 2004 but the last inoculation was given 1-21 days prior to the onset of clinical signs which indicates that the horse's immune system may not have had enough time to generate a protective immunity. The one horse that was fully vaccinated and euthanized was inoculated with a killed product. Additionally, there were 4 fully vaccinated horses with clinical symptoms of which three recovered completely and one shows residual effects of CNS disease. All four horses had been vaccinated with a killed product. Two other horses that were not vaccinated recovered with residual effects such as mild ataxia, decreased conscious proprioception in the hind limbs, and decreased cutaneous sensation. Seventy-two horses recovered completely without any side-effects, 24 of which were partially vaccinated. The final outcome on 6 horses remains unknown.

The NADFSL performed WNV IgG ELISA tests on 783 wild horses. Of these animals, 9 were found to be positive for WNV. Eight of these wild horses were located on the Goshute Horse Management Area in eastern Nevada near Wendover. All 9 of these horses appeared to completely recover.

In 2004 equine WNV disease incidence peaked at the same time in Southern and Northern Nevada. The majority of cases were diagnosed in the latter part of July and through the month of August. The earliest laboratory confirmed case of WNV in a horse was diagnosed on 7/12/04 and the last laboratory diagnosed case of the season occurred on 10/12/05.

Figure 3.



Refer to Table 3 for the county breakdown of positive domestic horses and the number that died or were euthanized.

Table 3

County	Positive cases	Died/ Euth.
Carson	9	4
Churchill	44	12
Clark	28	12
Douglas	22	11
Lyon	13	4
Nye	2	0
Washoe	13	7
Totals	**131**	**50**

WNV Testing of Other Species

Three other species of livestock and companion animals, other than horses, were tested using QRT-PCR at the NADFSL during 2004 (Table 4).

Table 4

Species	# tested	# positive
Alpaca	2	0
Caprine	1	0
Canine	10	3

Further Information

Further information may be found at the following internet sites:

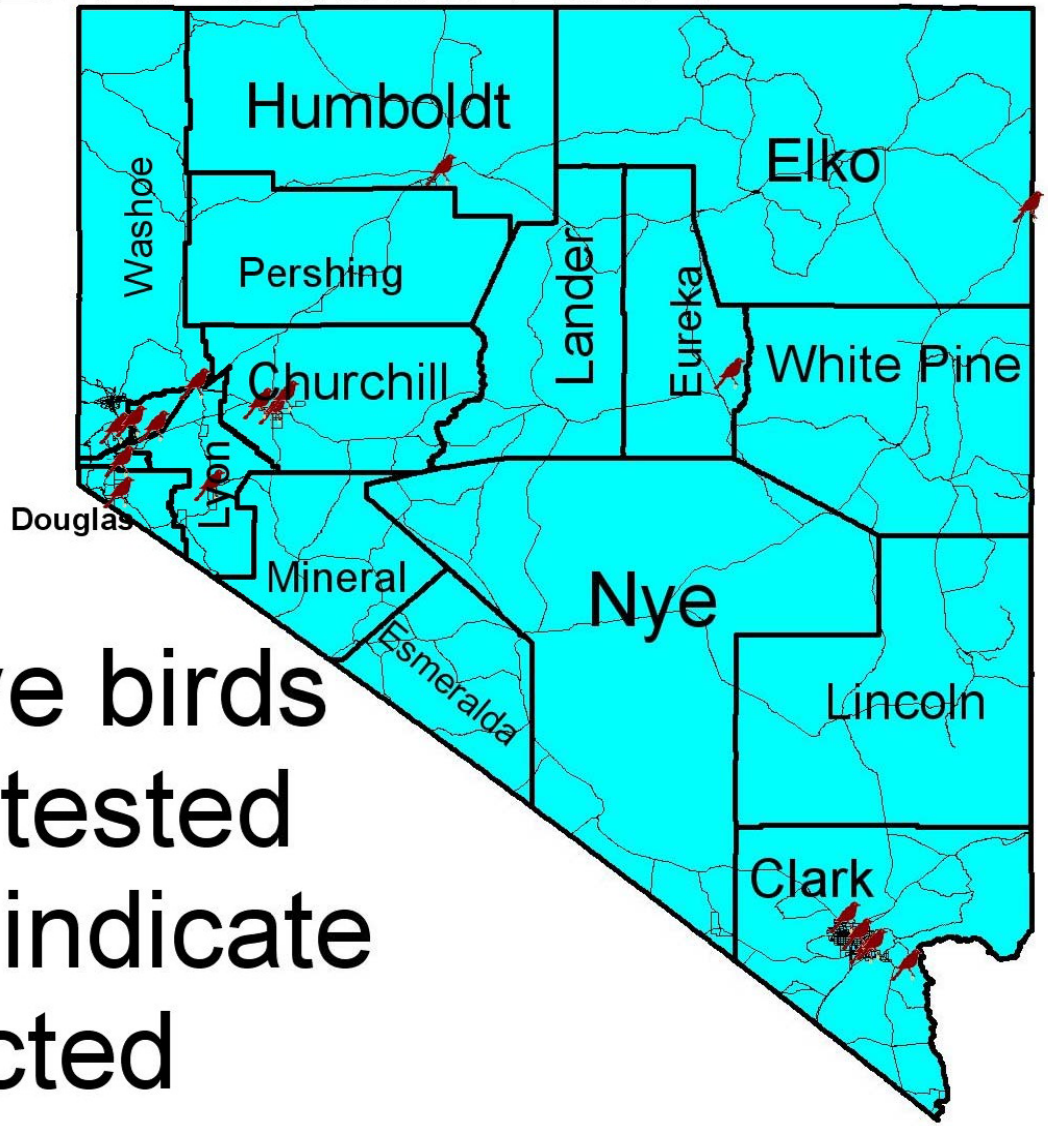
http://agri.nv.gov/Animal_index.htm

http://health2k.state.nv.us/special/wnv/

http://www.cdc.gov/ncidod/dvbid/westnile/

WNV Bird Cases 2004

Figure 1.



150 positive birds out of 852 tested
Bird Icons indicate areas affected

WNV Mosquito Pools 2004

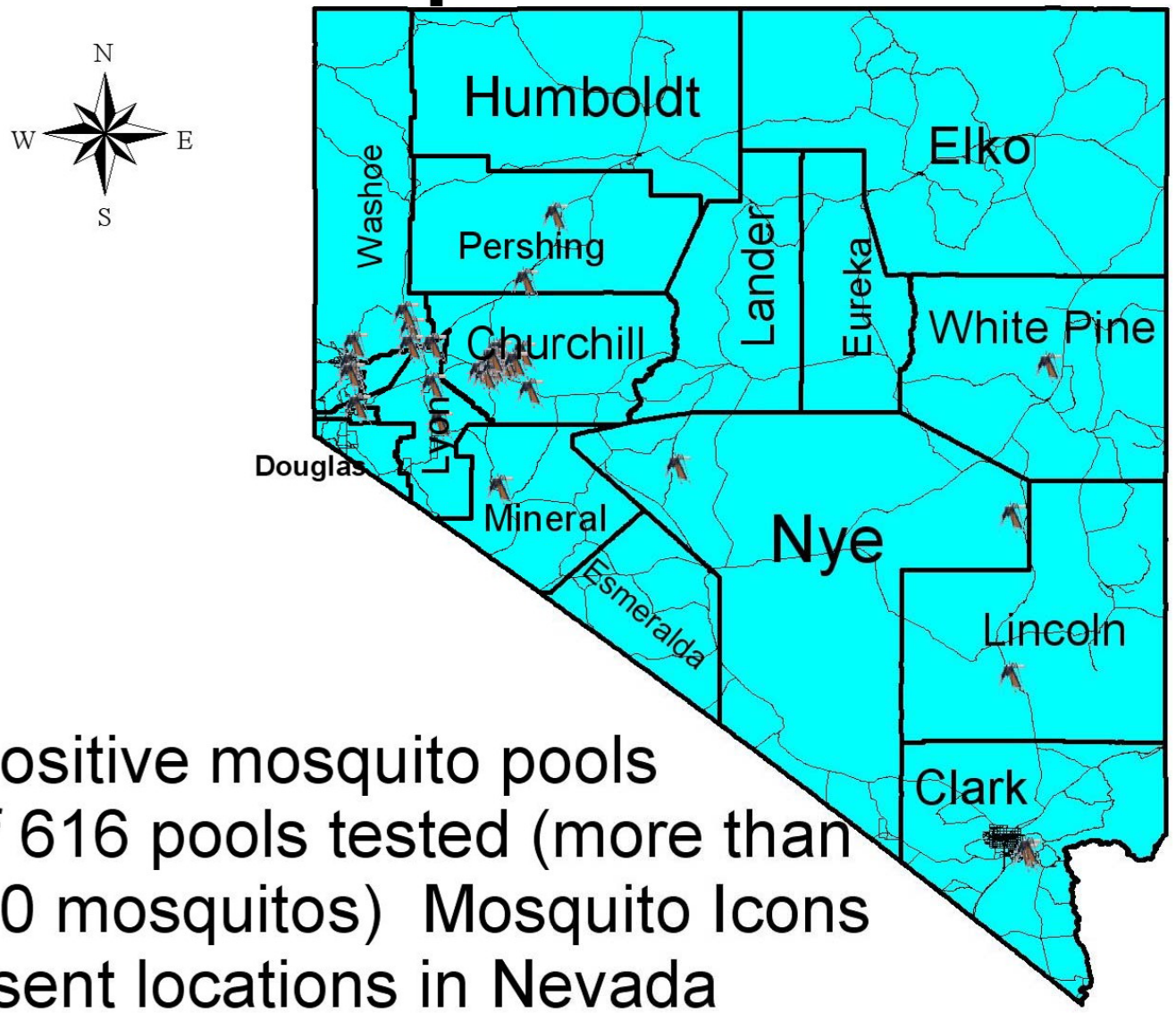


Figure 2.

132 positive mosquito pools out of 616 pools tested (more than 27,000 mosquitos) Mosquito Icons represent locations in Nevada

WNV EQUINE CASES 2004

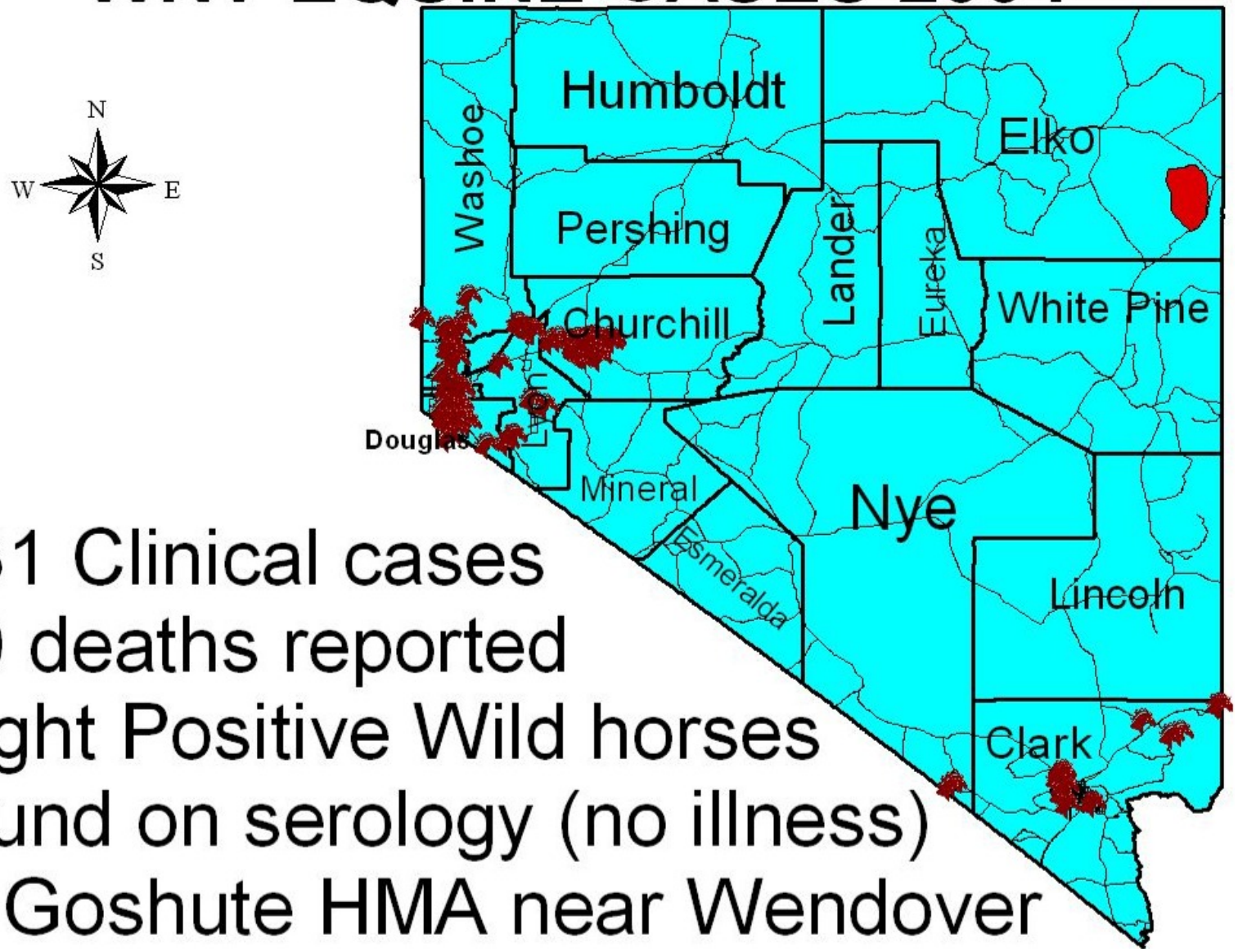


Figure 3.

131 Clinical cases
50 deaths reported
Eight Positive Wild horses
found on serology (no illness)
in Goshute HMA near Wendover

WNV ZIPCODE AREAS 2004

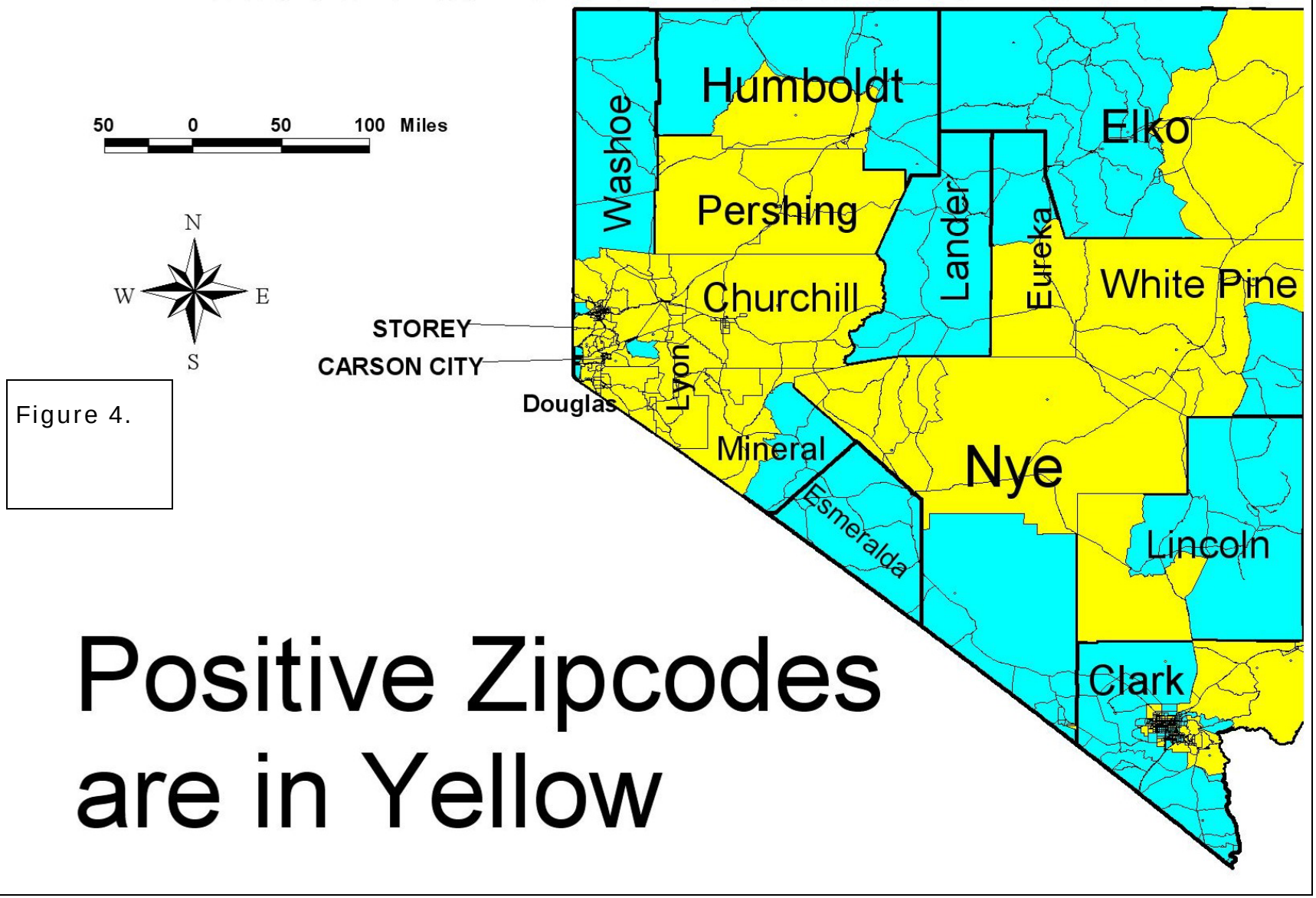


Figure 4.